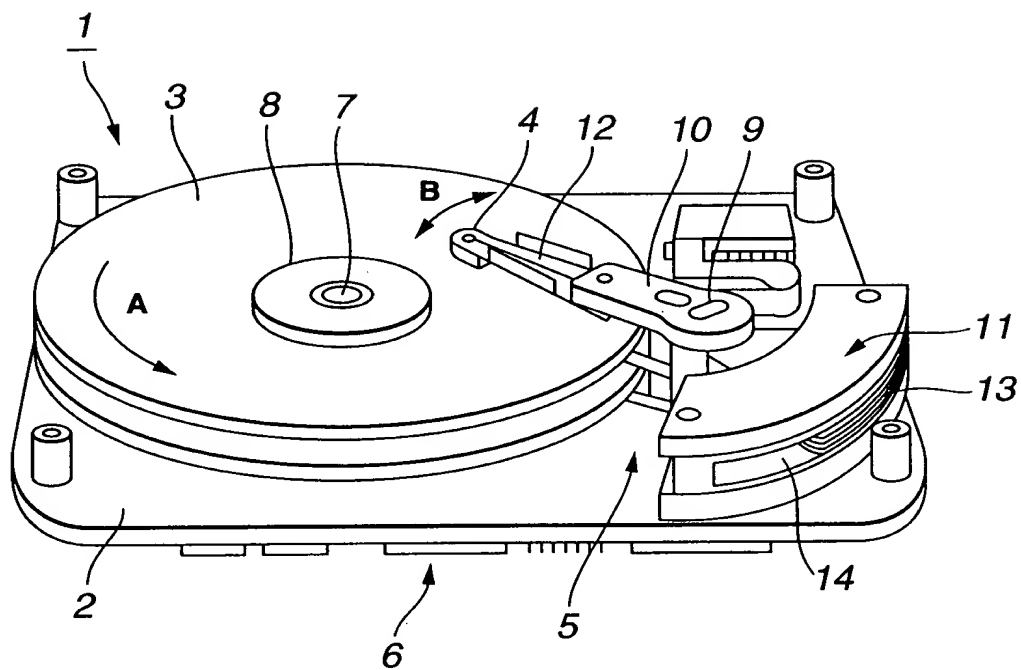


FIG. 1



**FIG.1**

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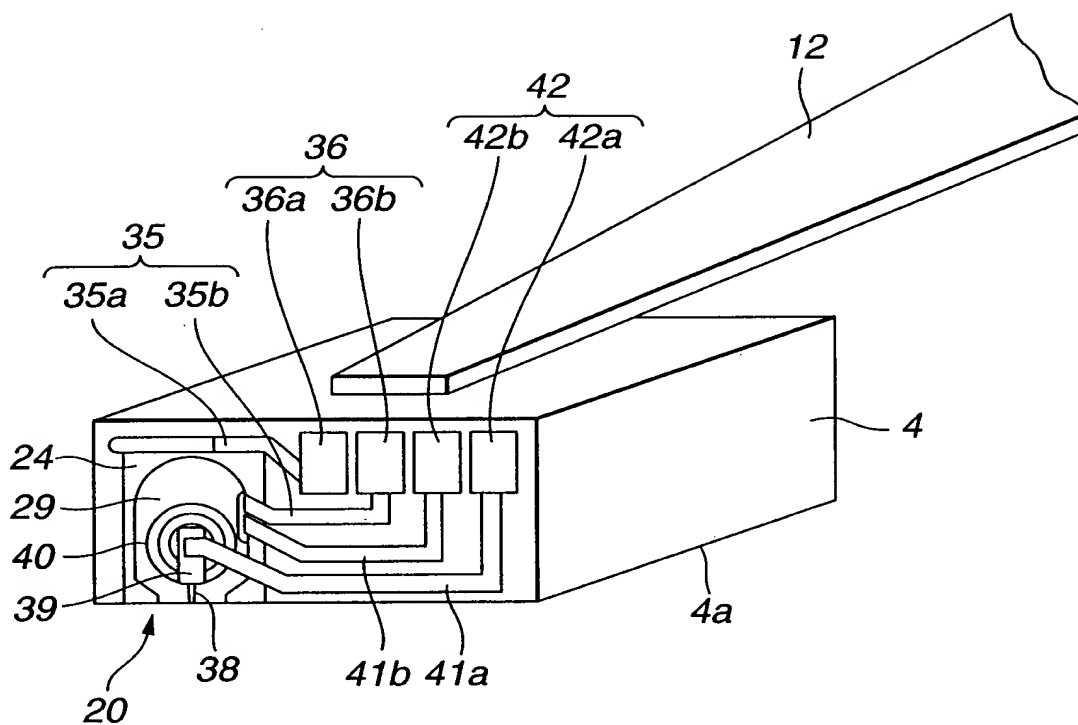


FIG.2

20

38

37

30

29

28

Tw2

27a

27

26

24

23

25

21

34

32

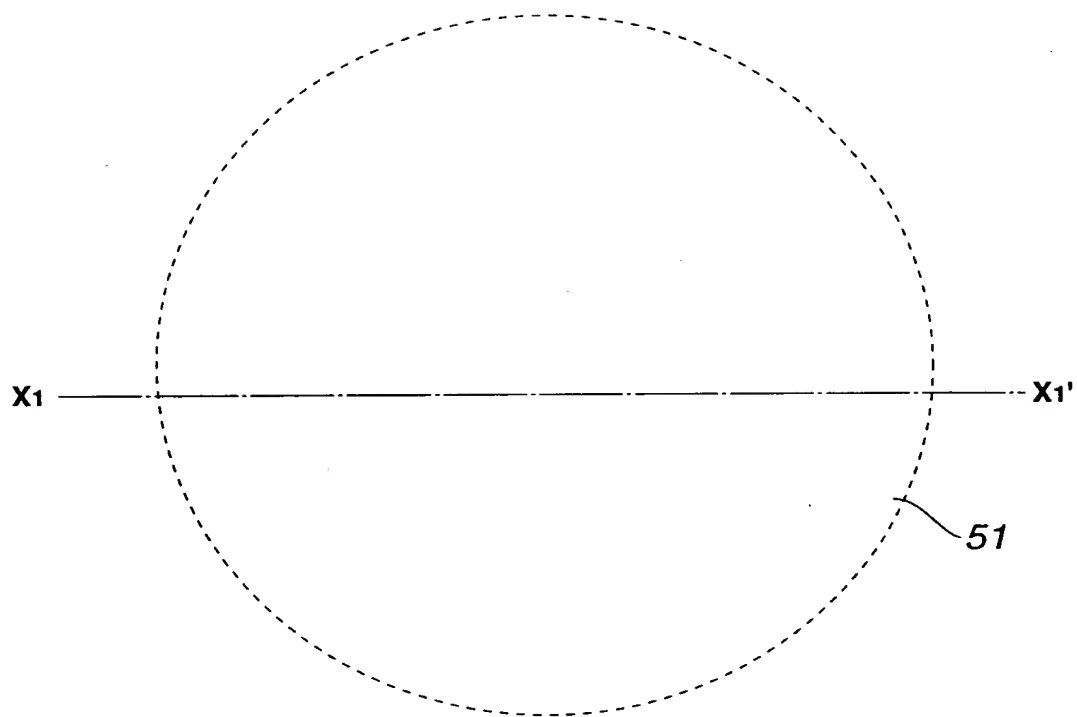
33

31

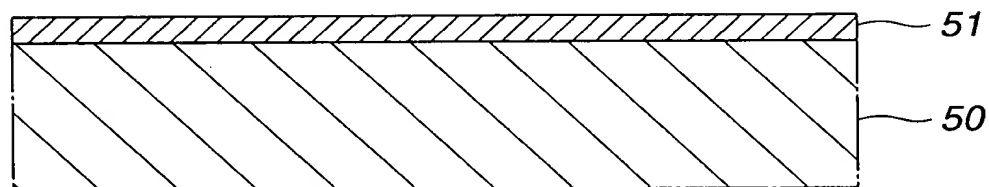
28a

Tw1

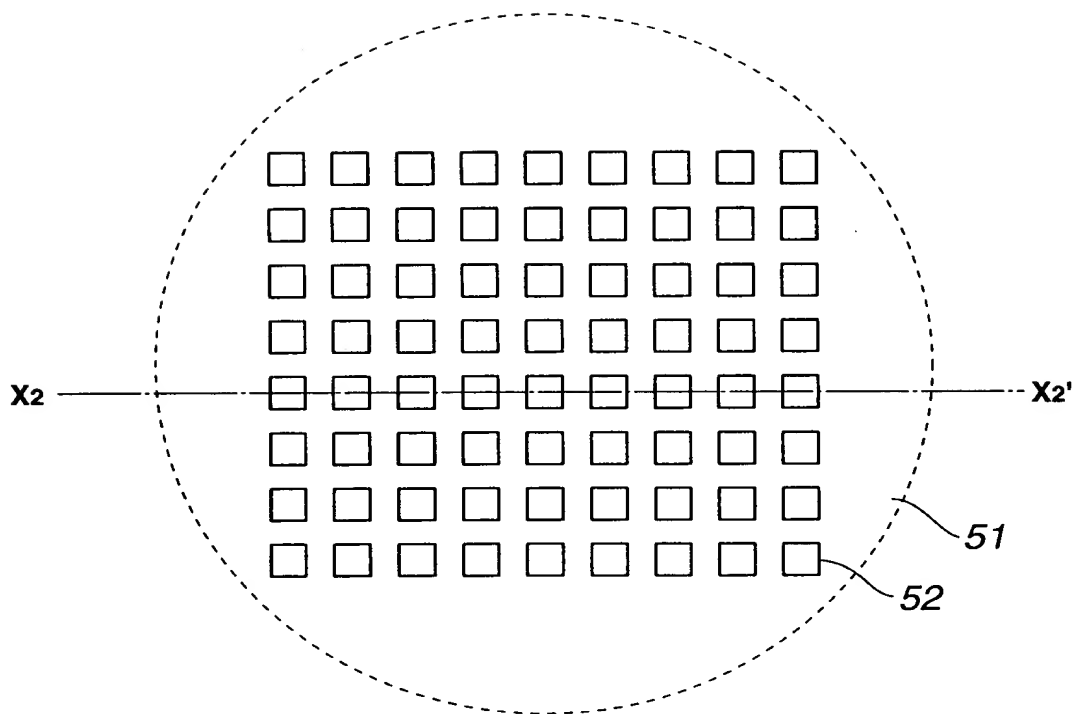
**FIG.3**



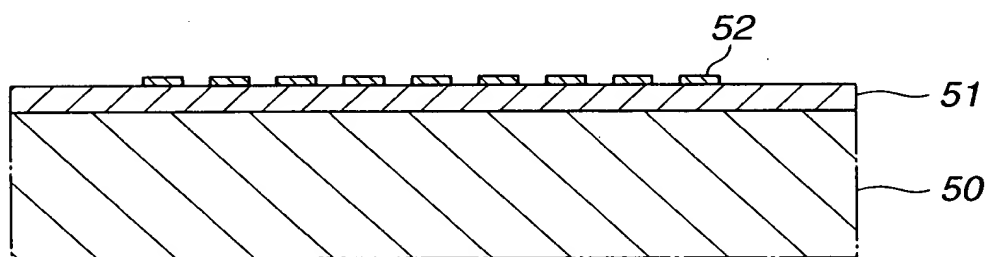
**FIG.4**



**FIG.5**

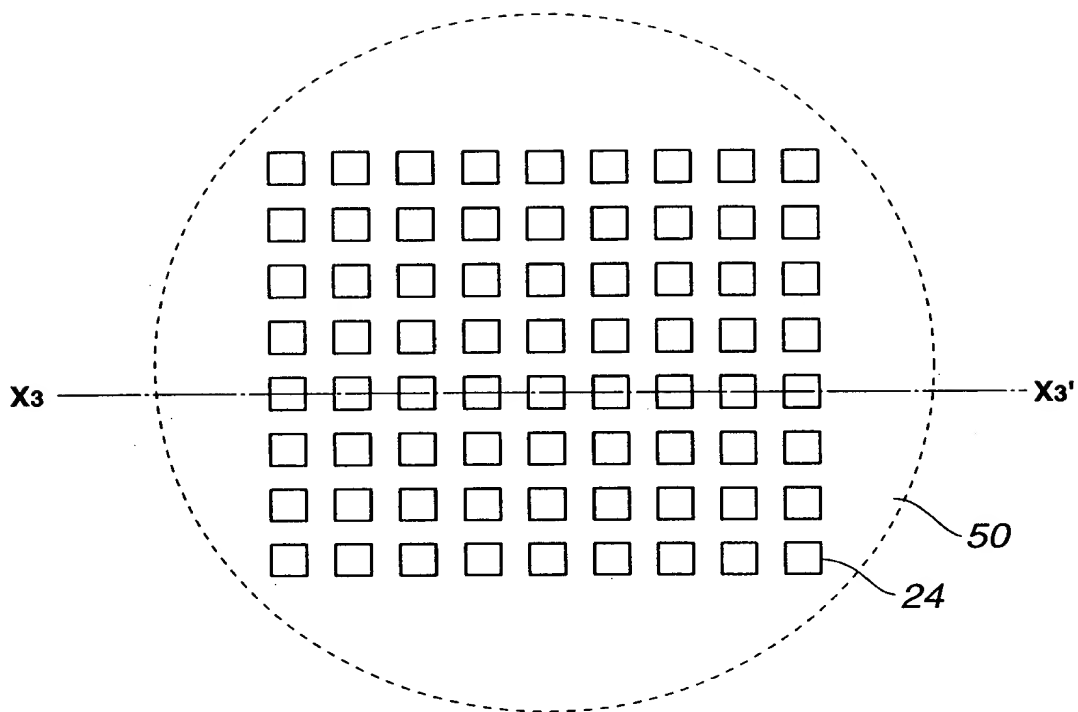


**FIG. 6**

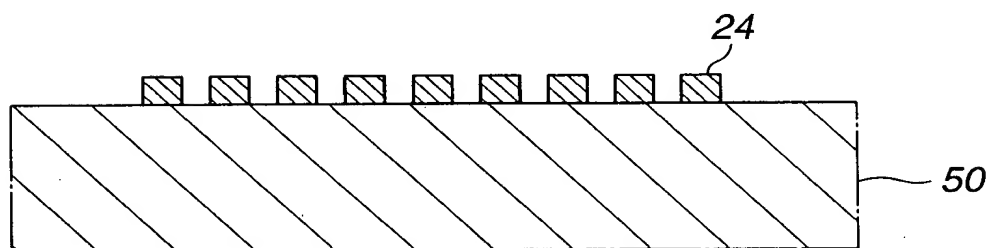


**FIG. 7**

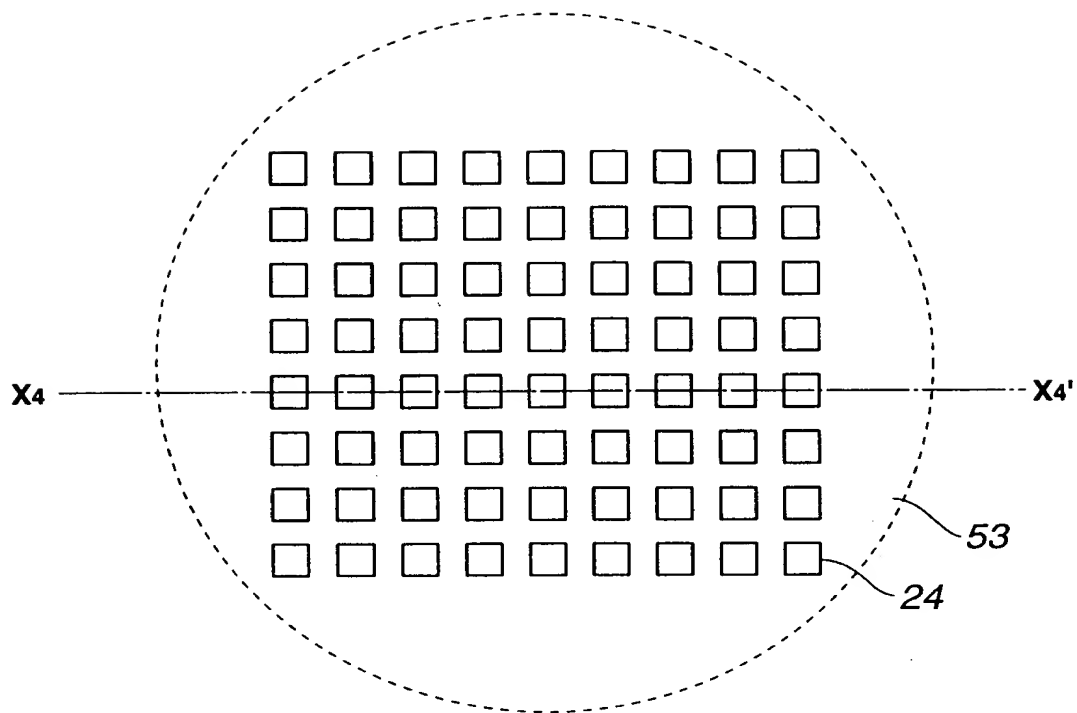
0989259-070301  
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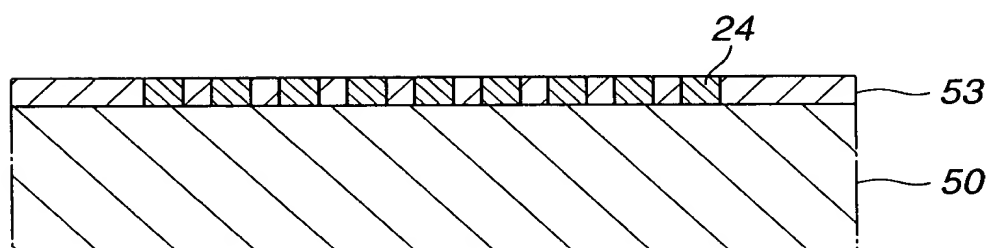
**FIG. 8**



**FIG. 9**



**FIG.10**



**FIG.11**

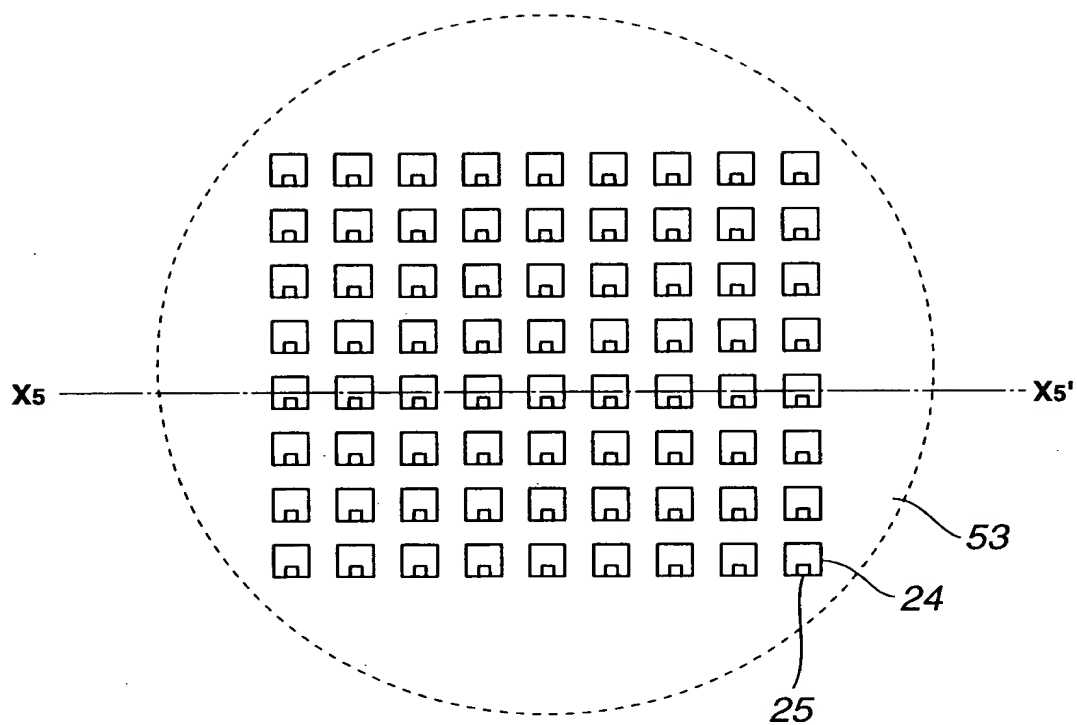


FIG. 12

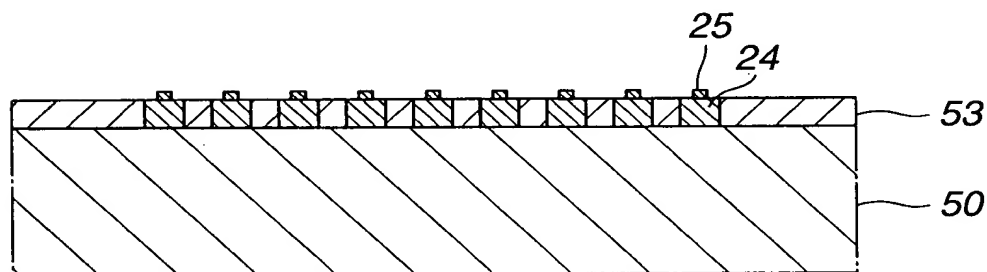
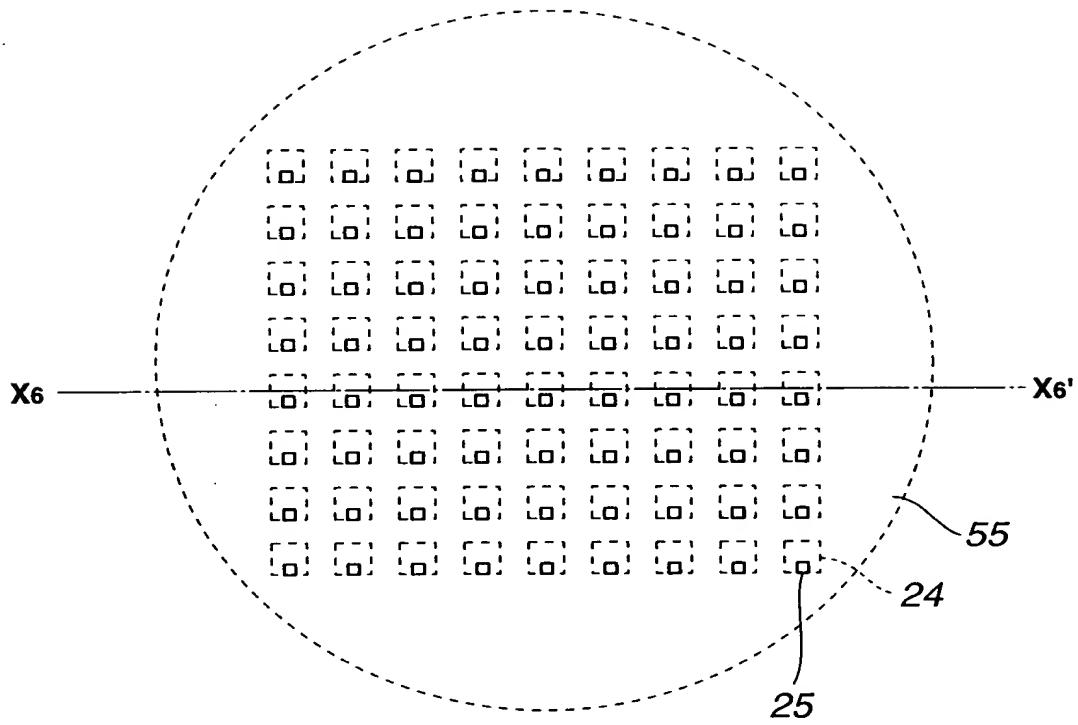
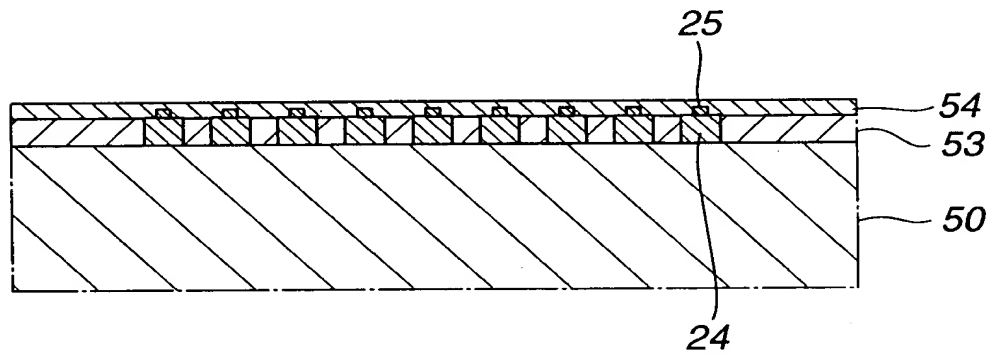


FIG. 13

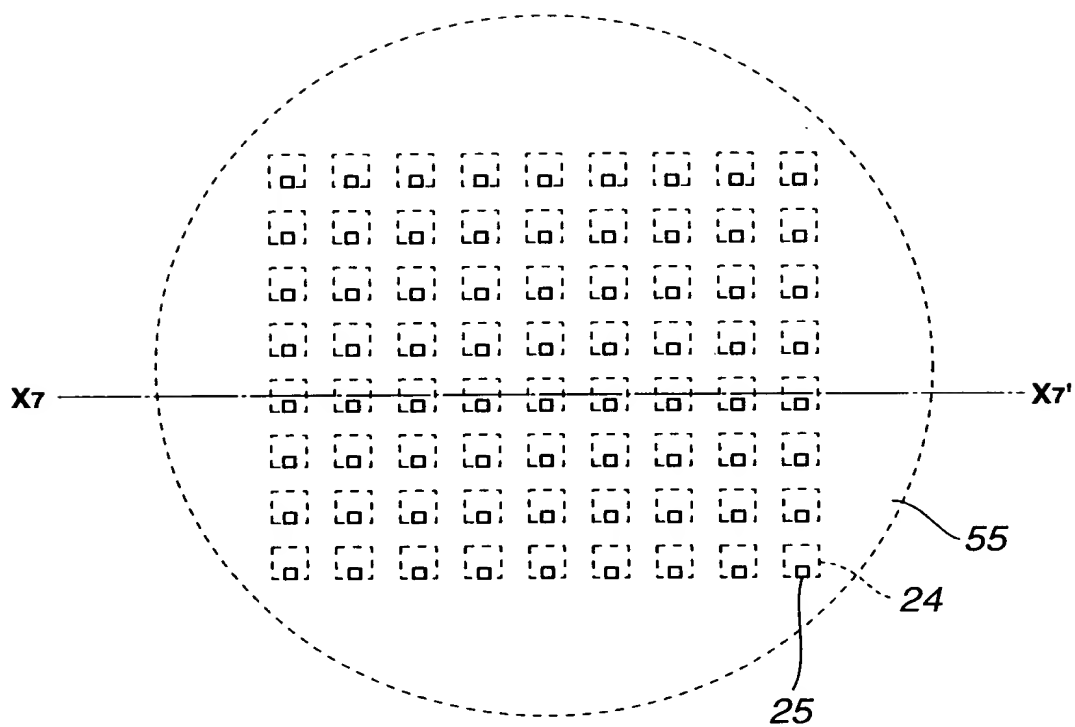




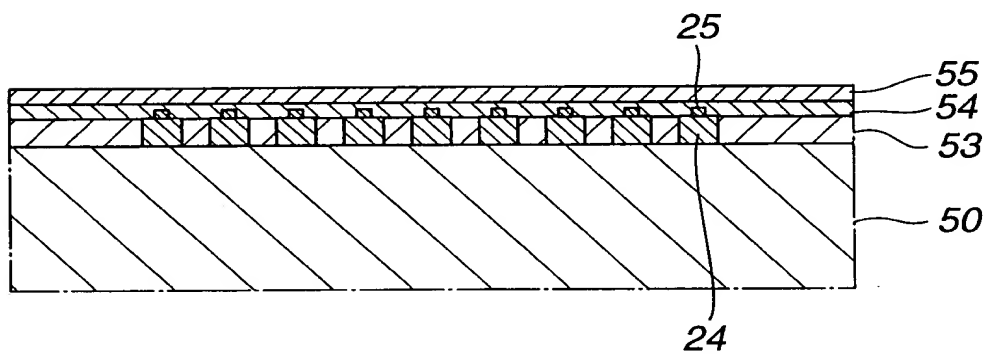
**FIG.14**



**FIG.15**



**FIG.16**



**FIG.17**

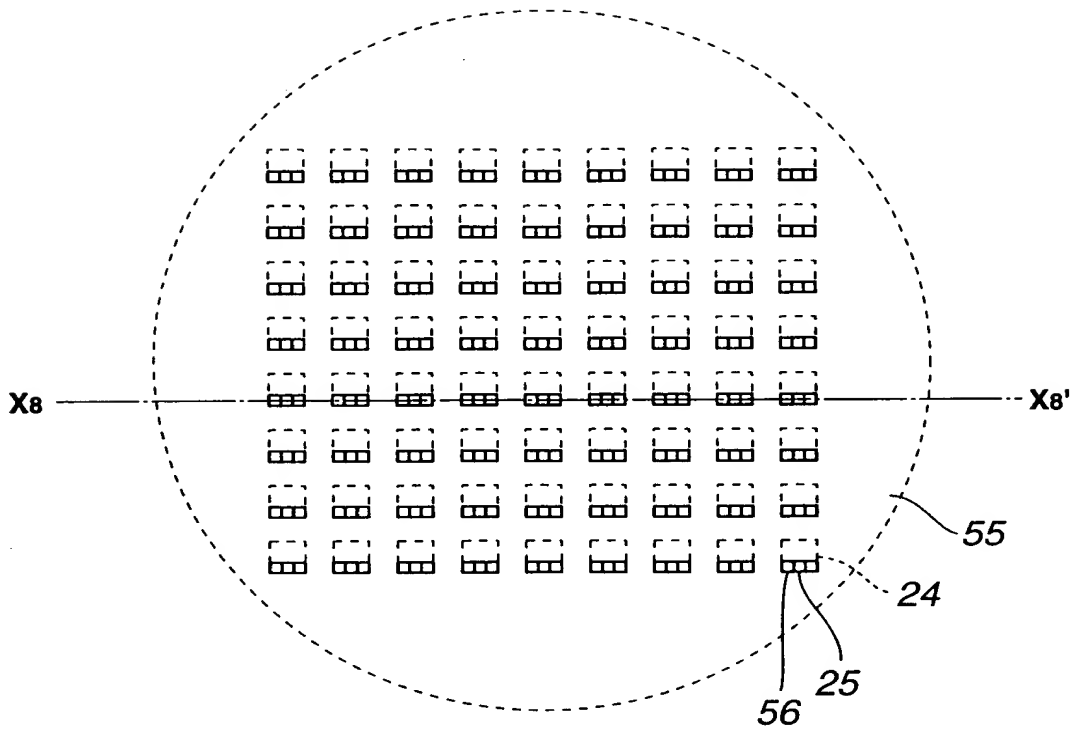


FIG.18

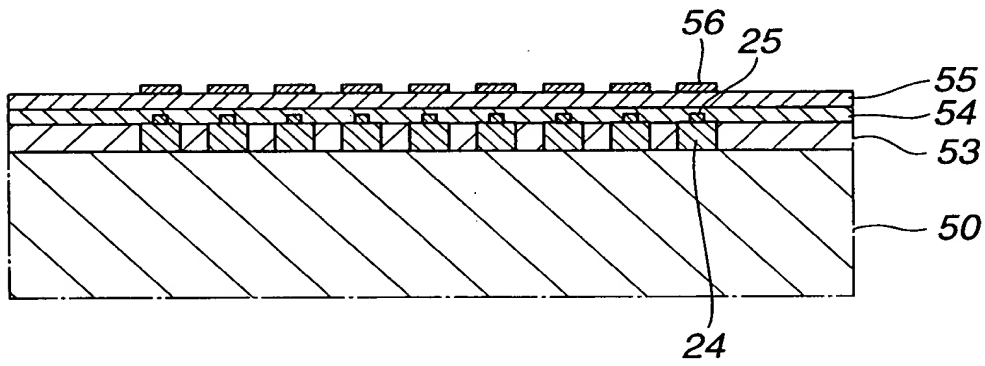


FIG.19

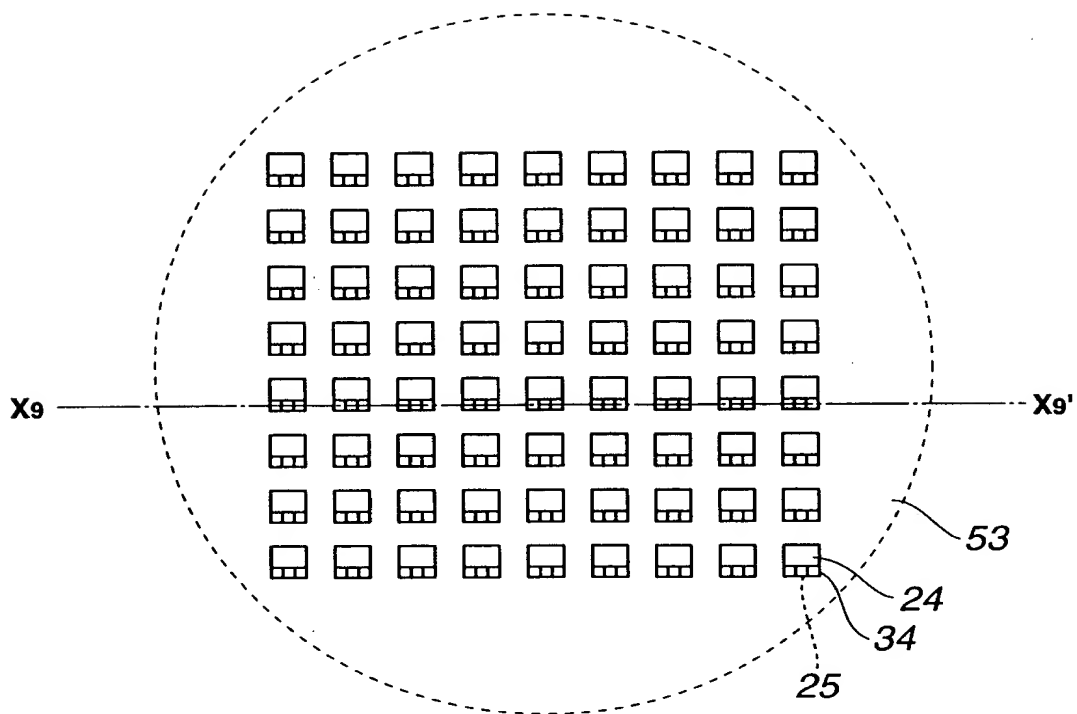


FIG. 20

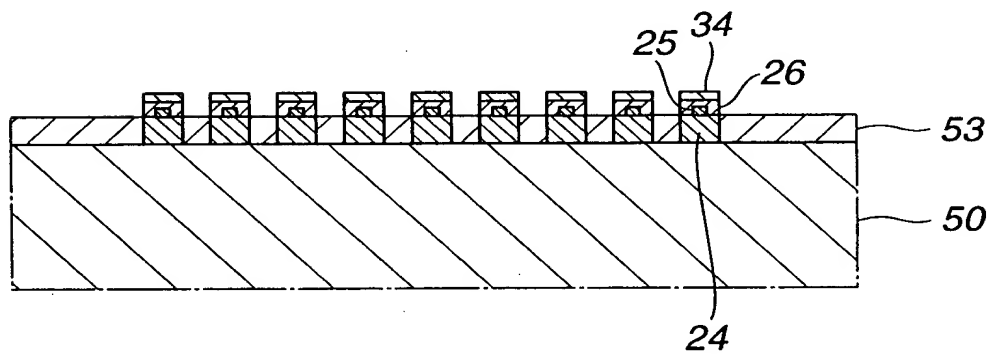
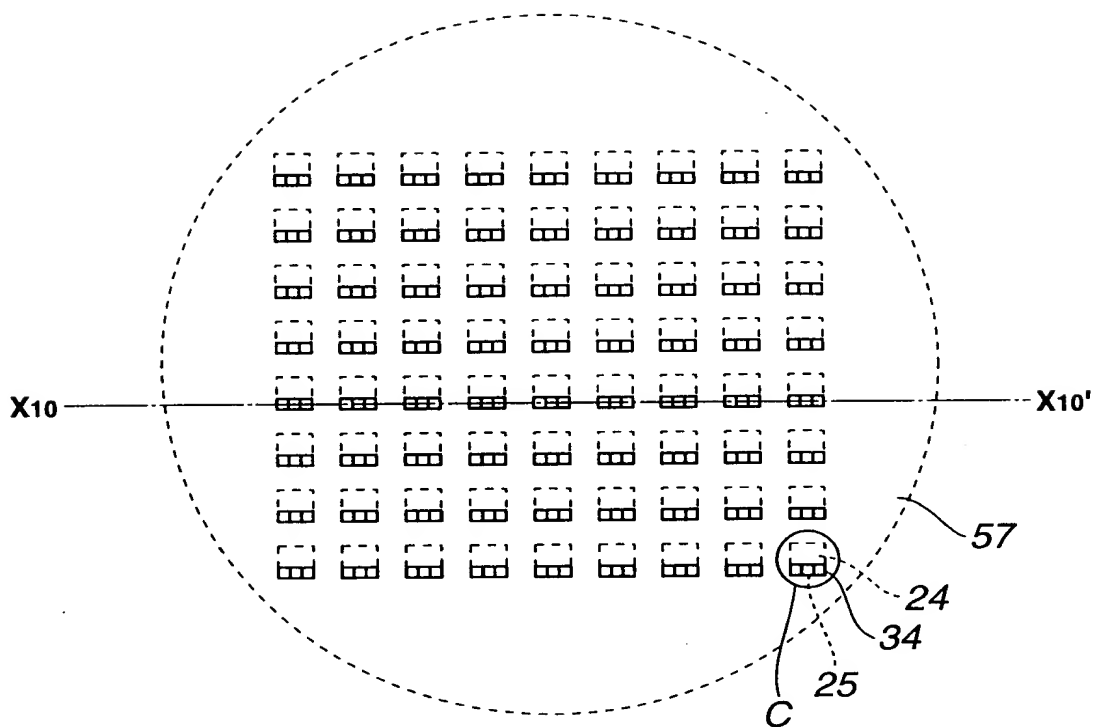
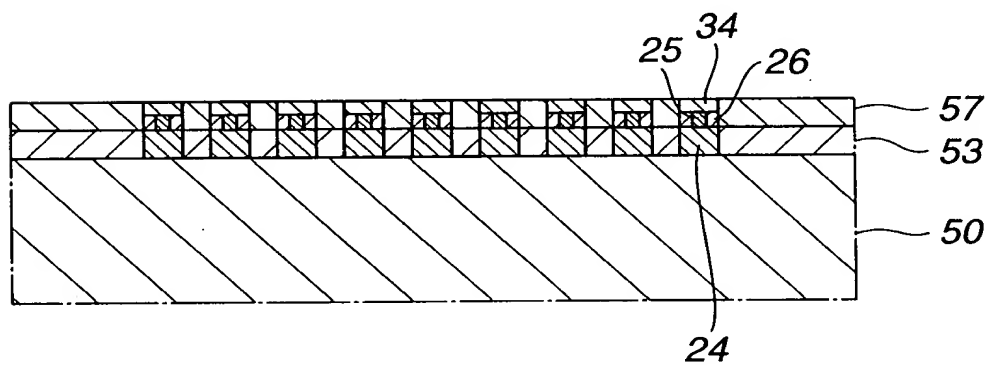


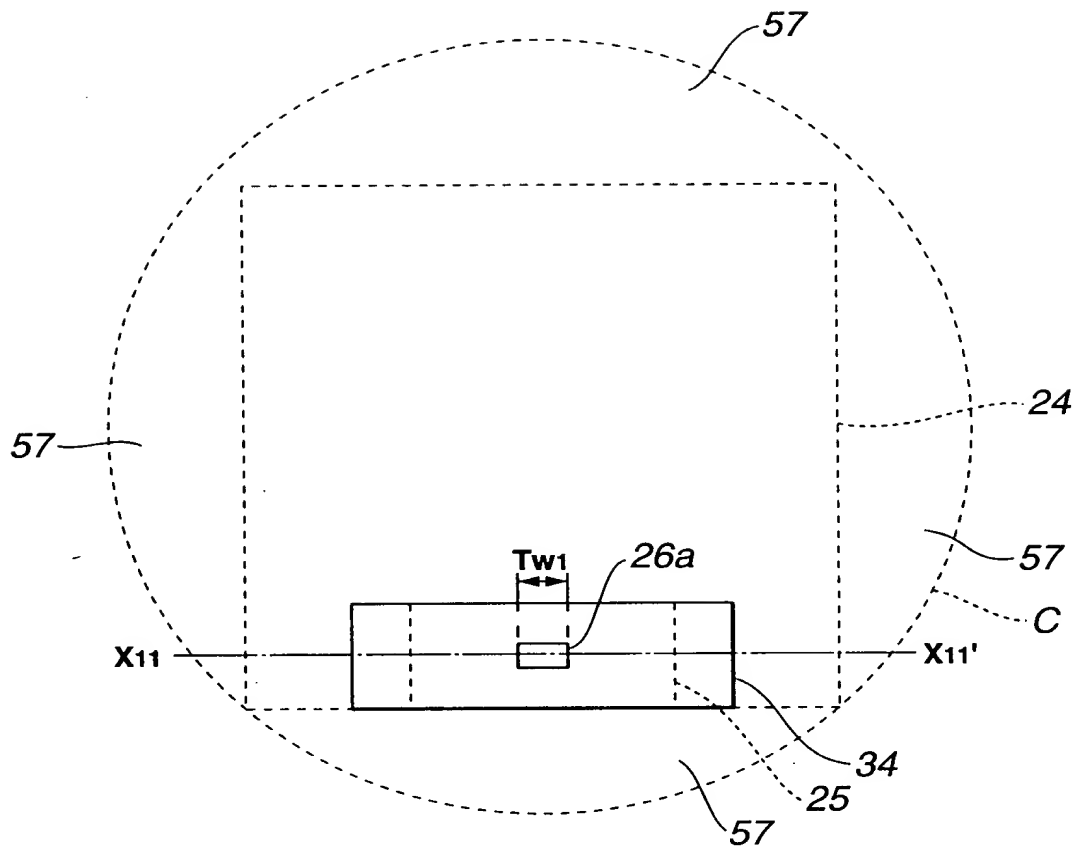
FIG. 21



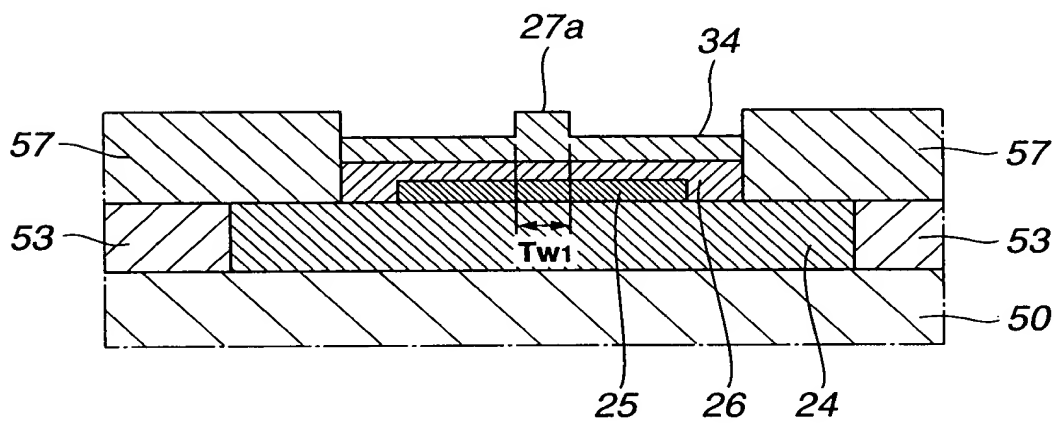
**FIG.22**



**FIG.23**



**FIG. 24**



**FIG. 25**

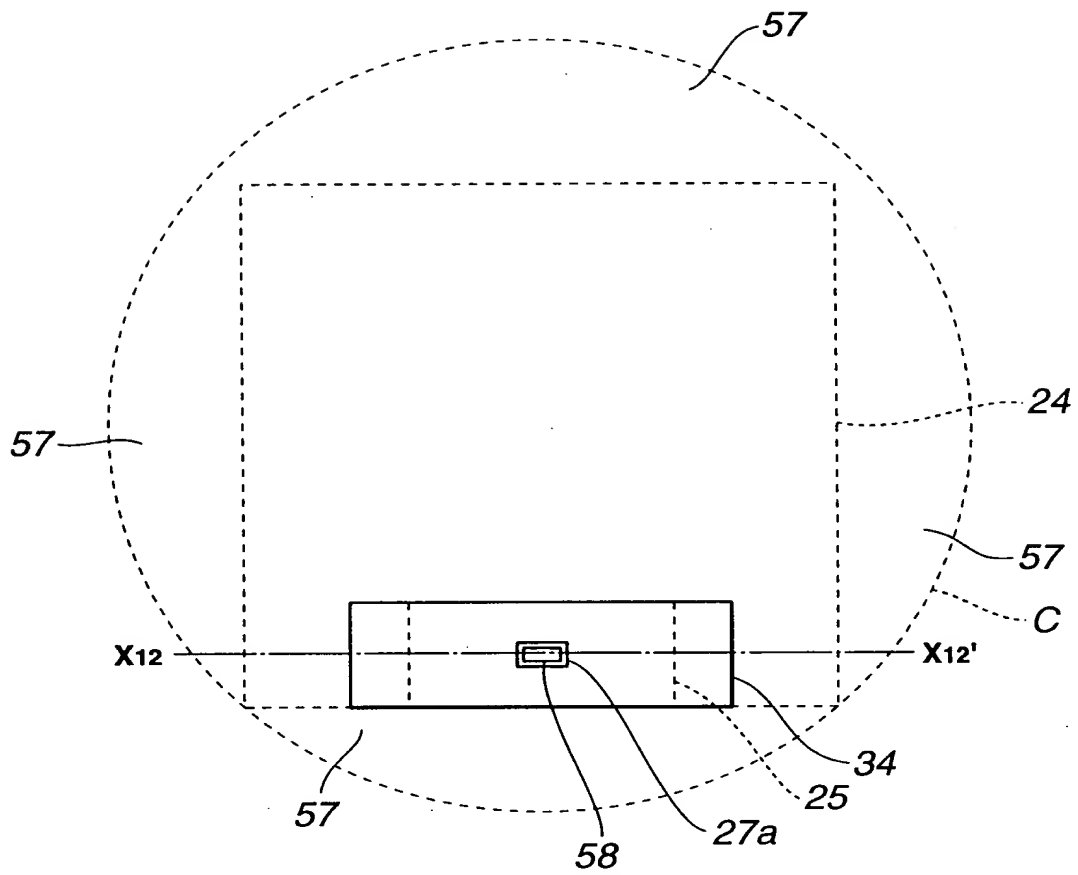


FIG. 26

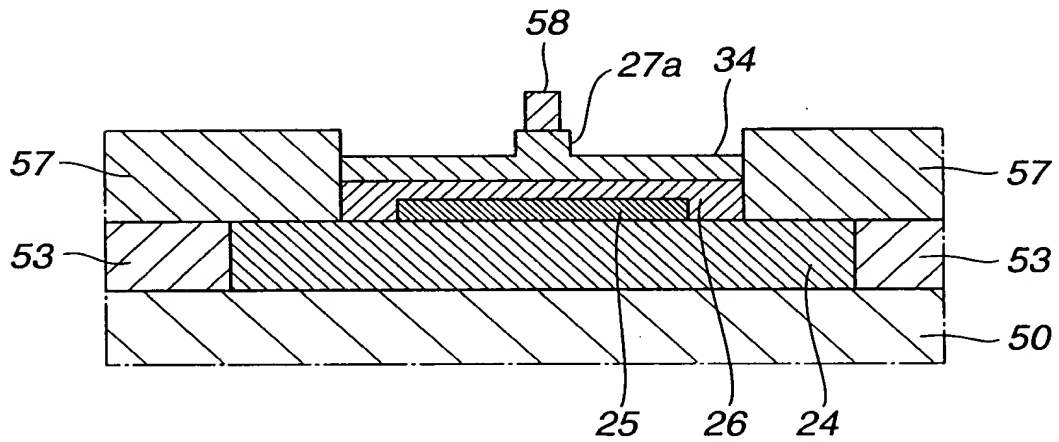


FIG. 27

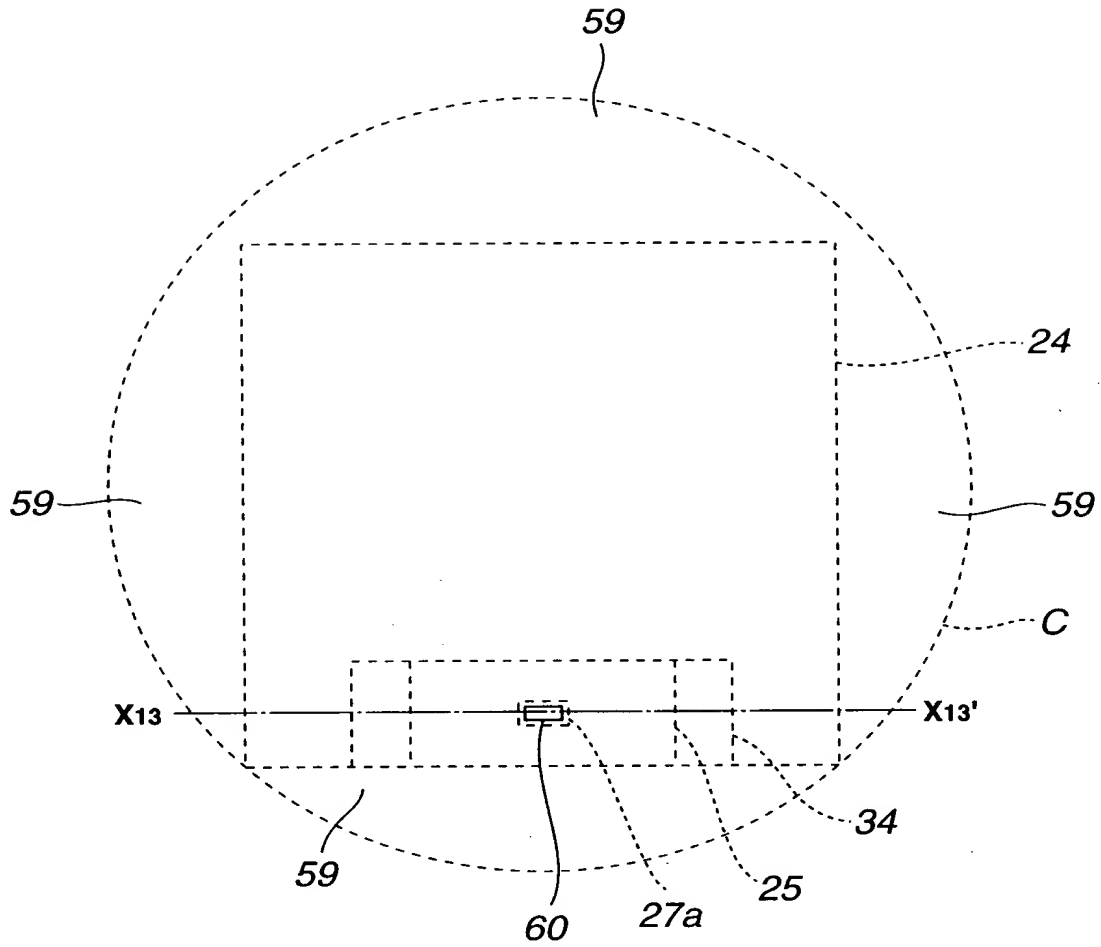


FIG.28

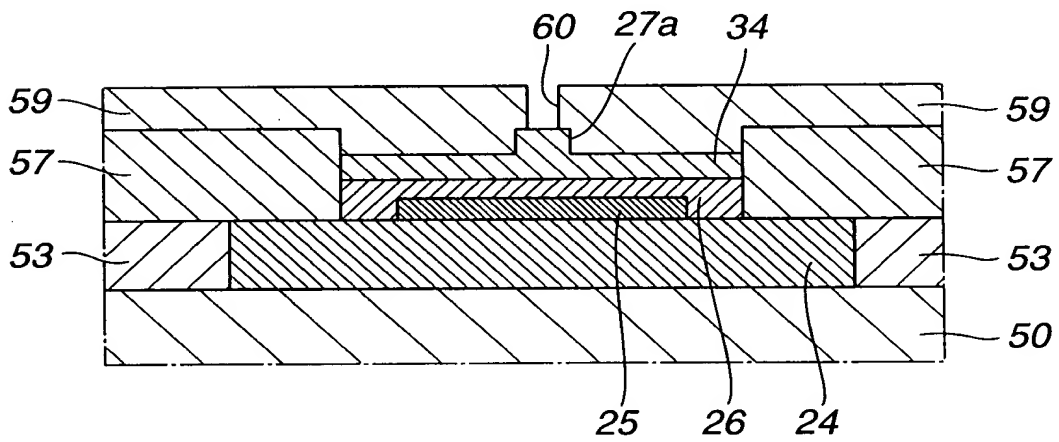
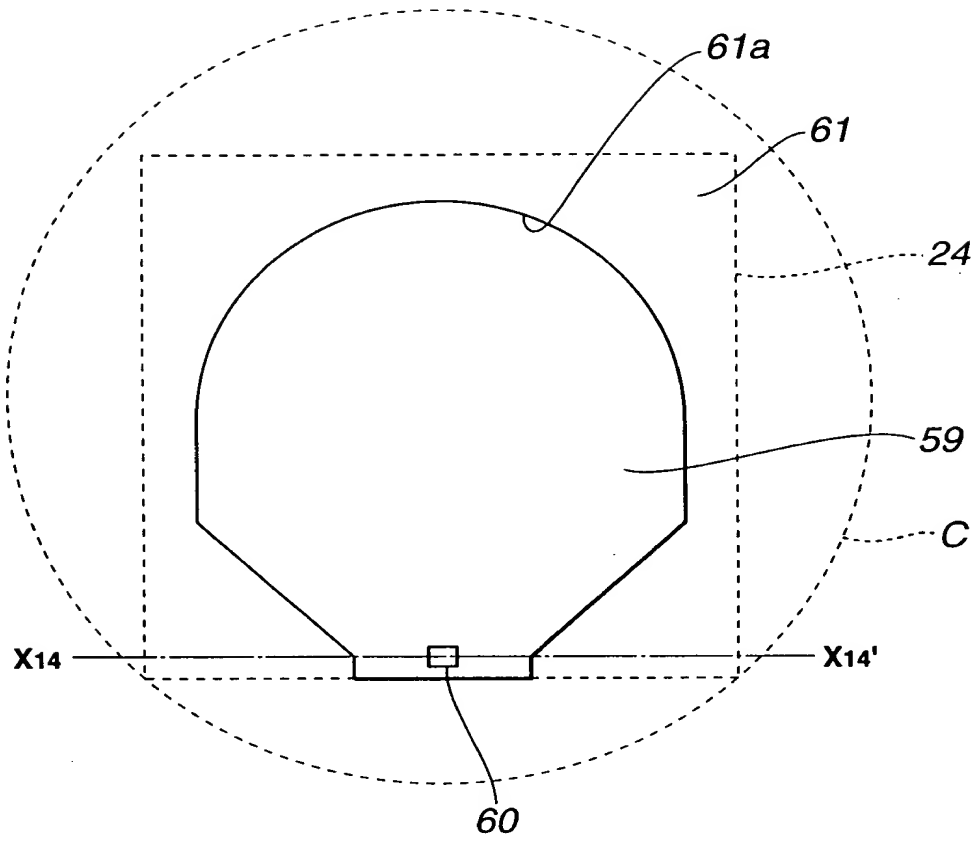
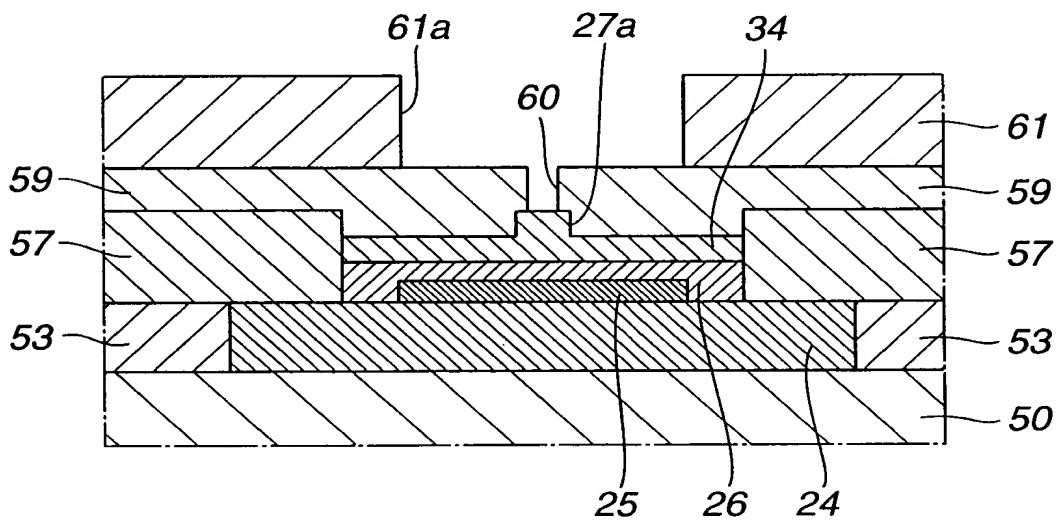


FIG.29

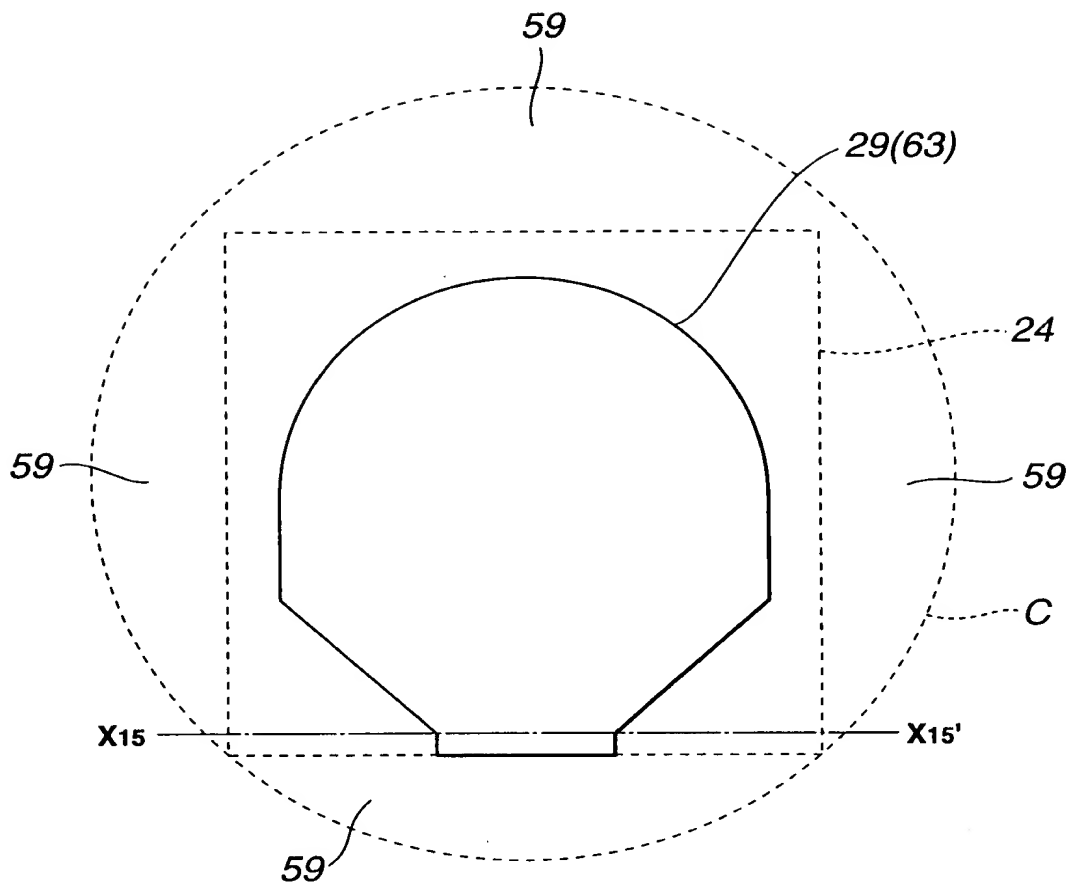




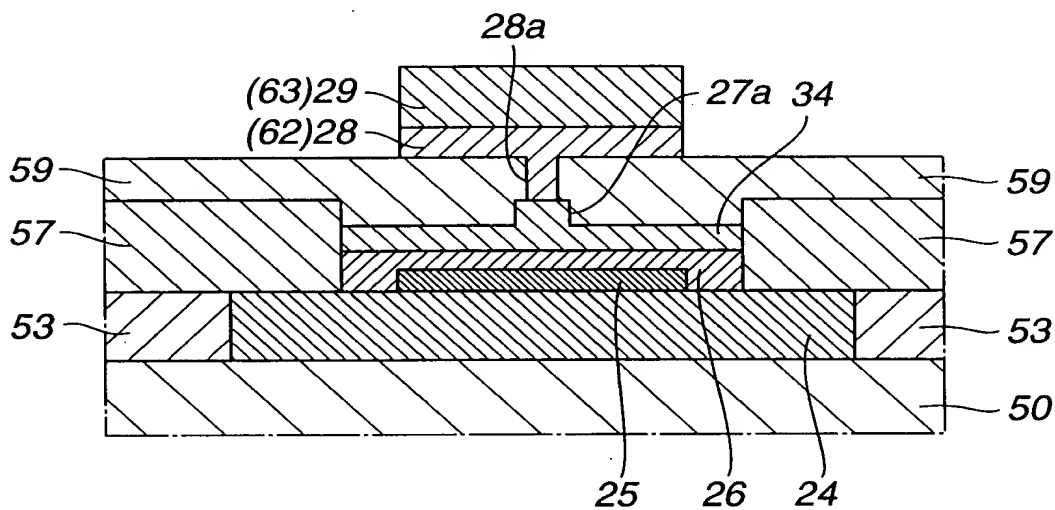
**FIG.30**



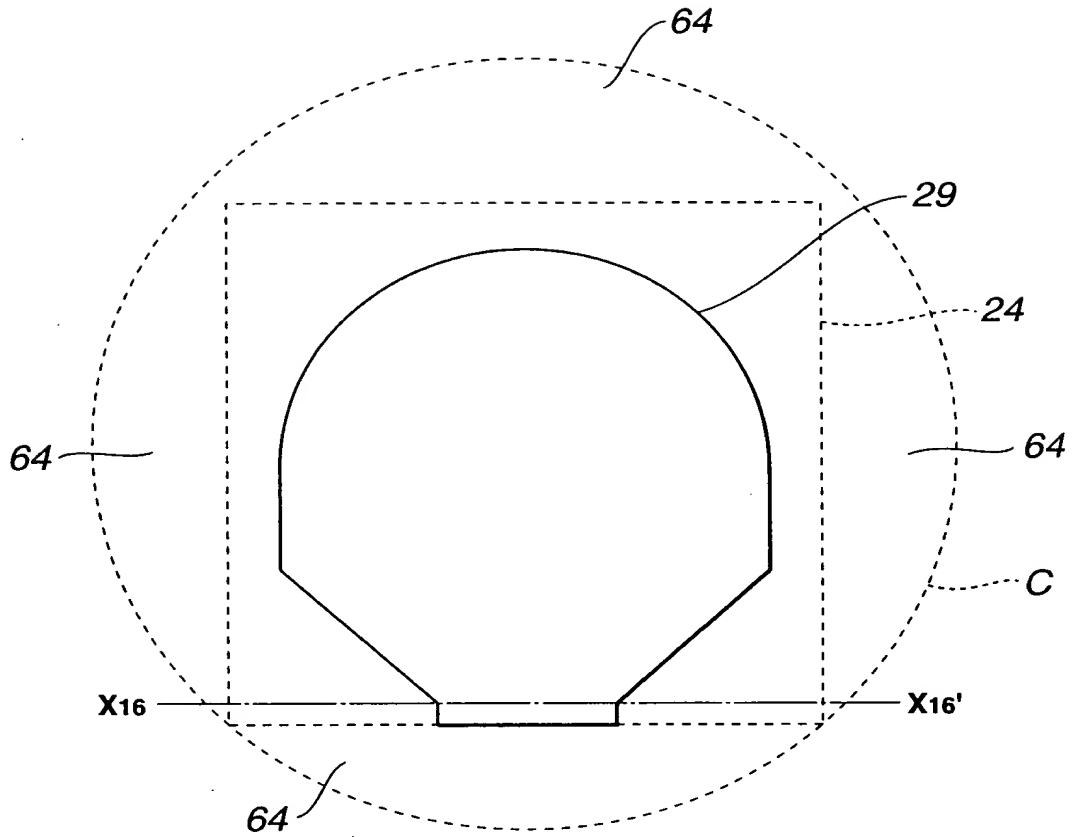
**FIG.31**



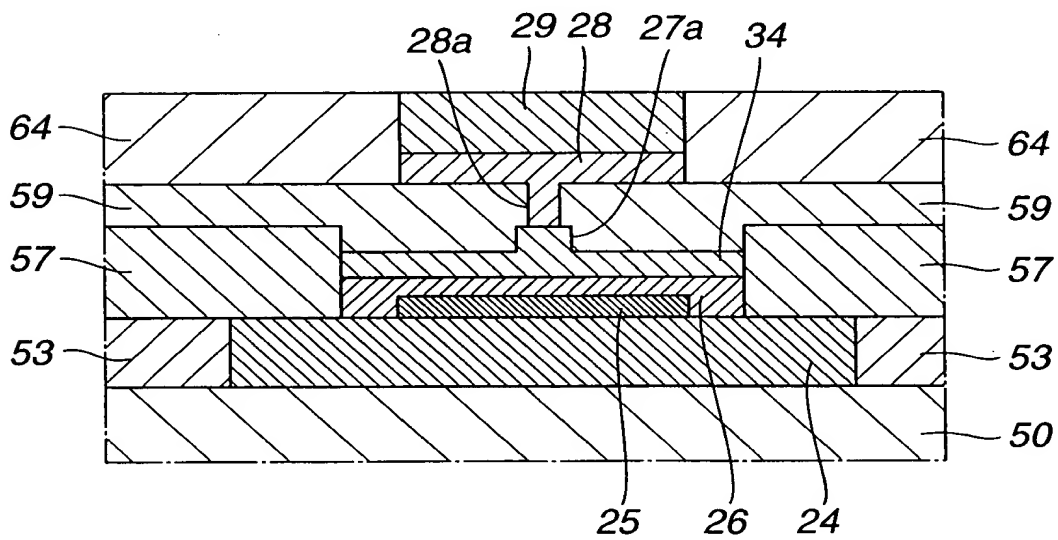
**FIG.32**



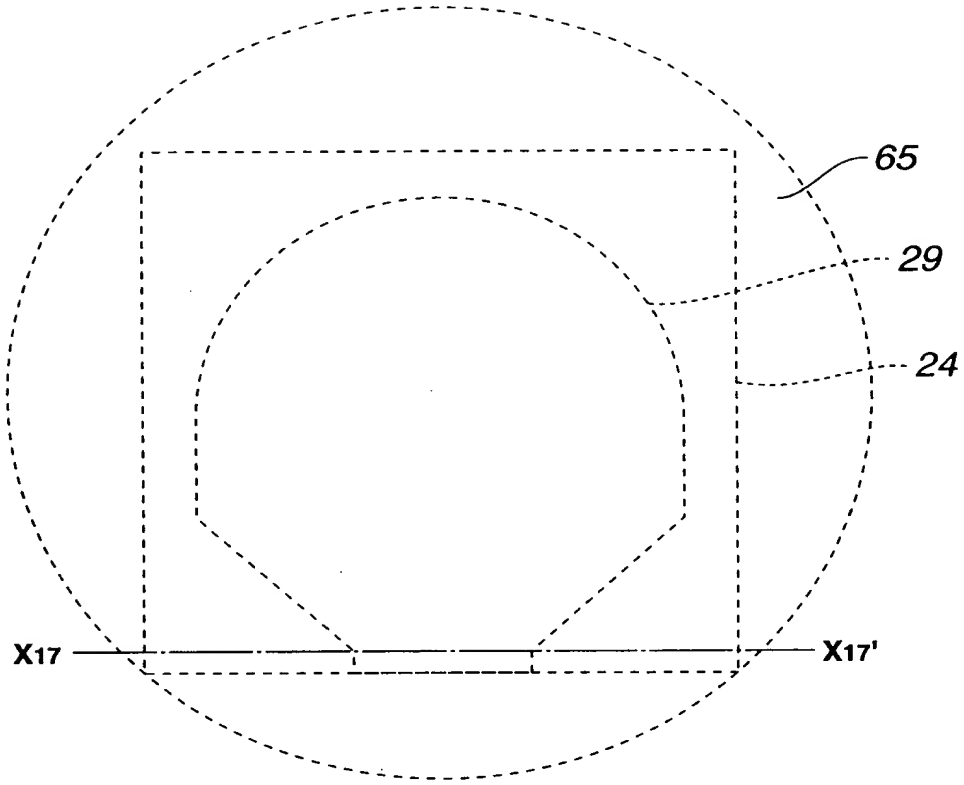
**FIG.33**



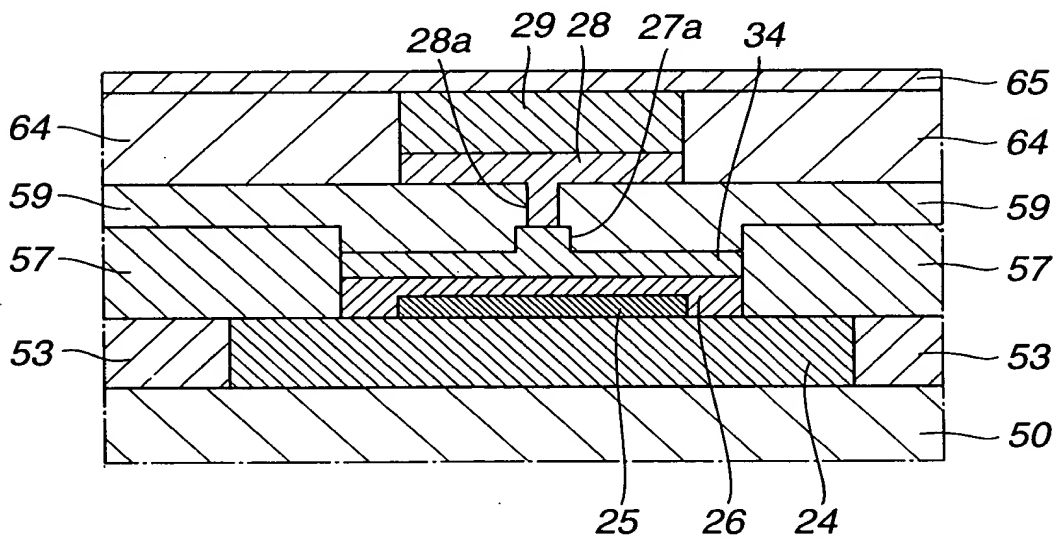
**FIG.34**



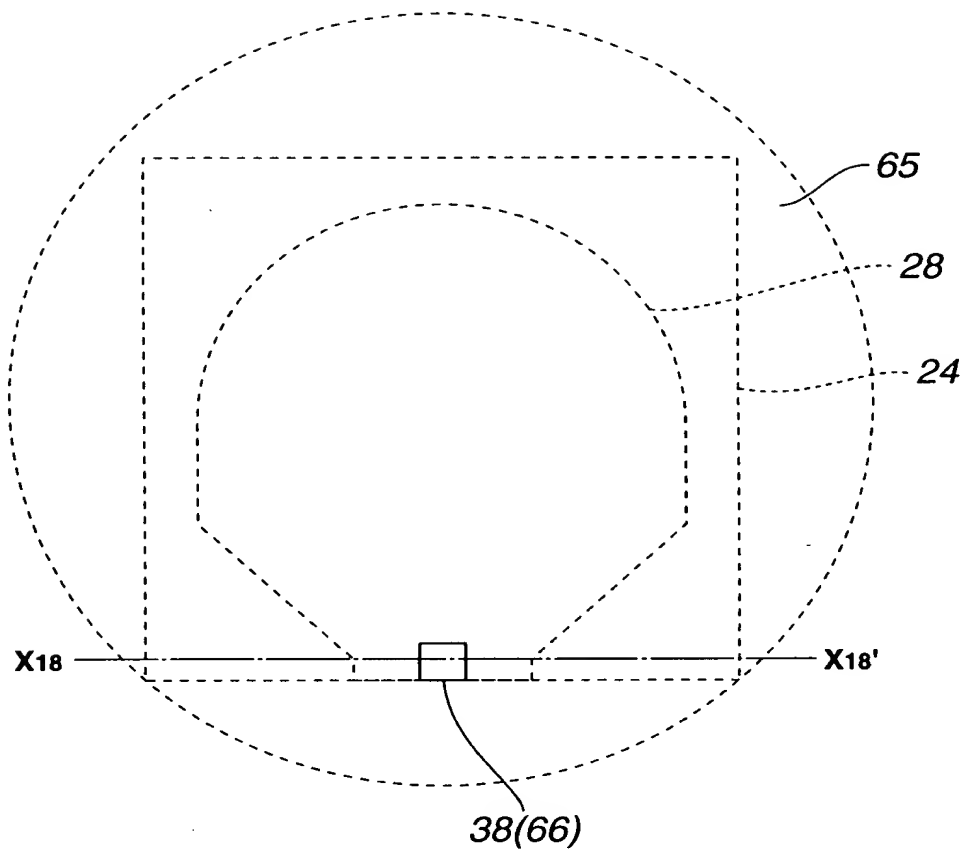
**FIG.35**



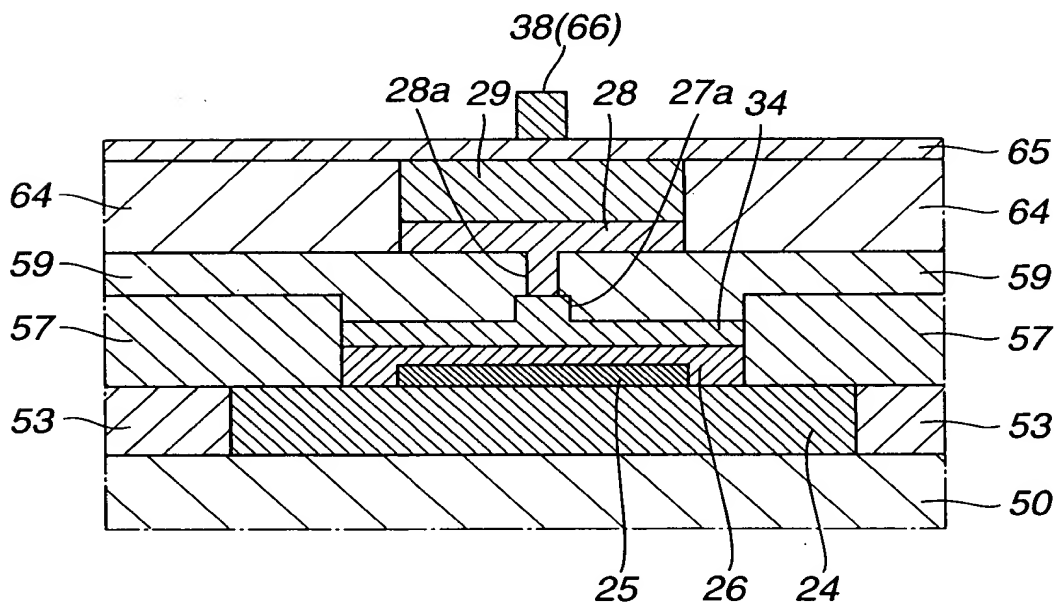
**FIG.36**



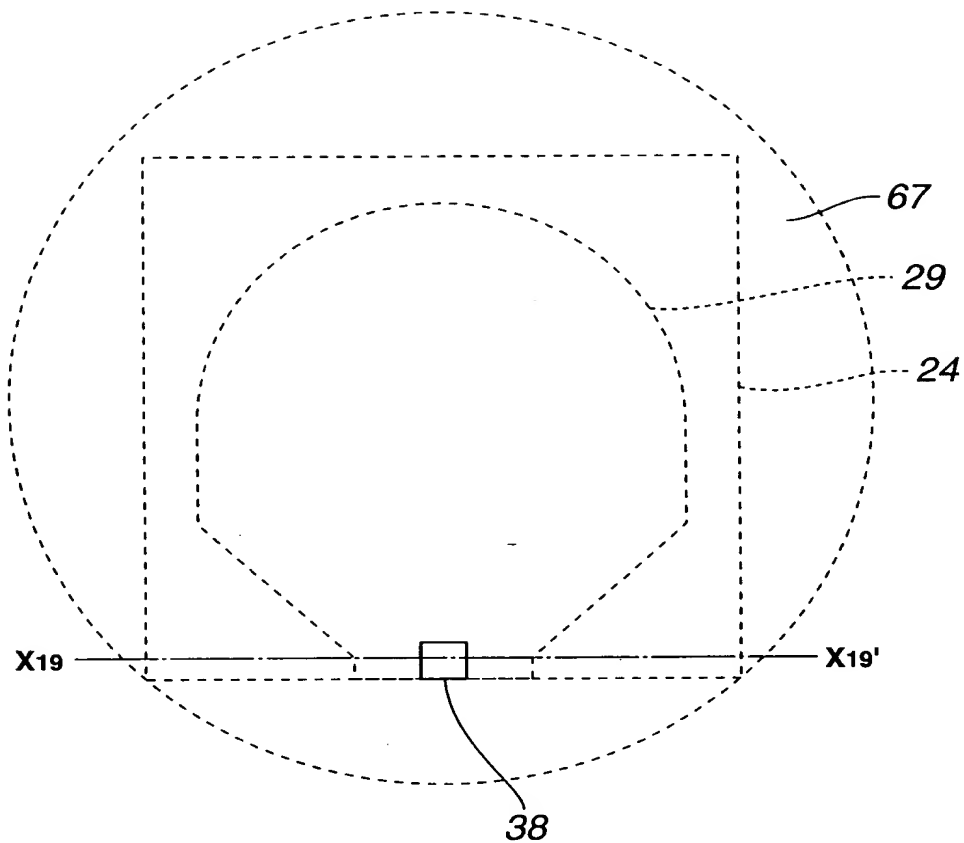
**FIG.37**



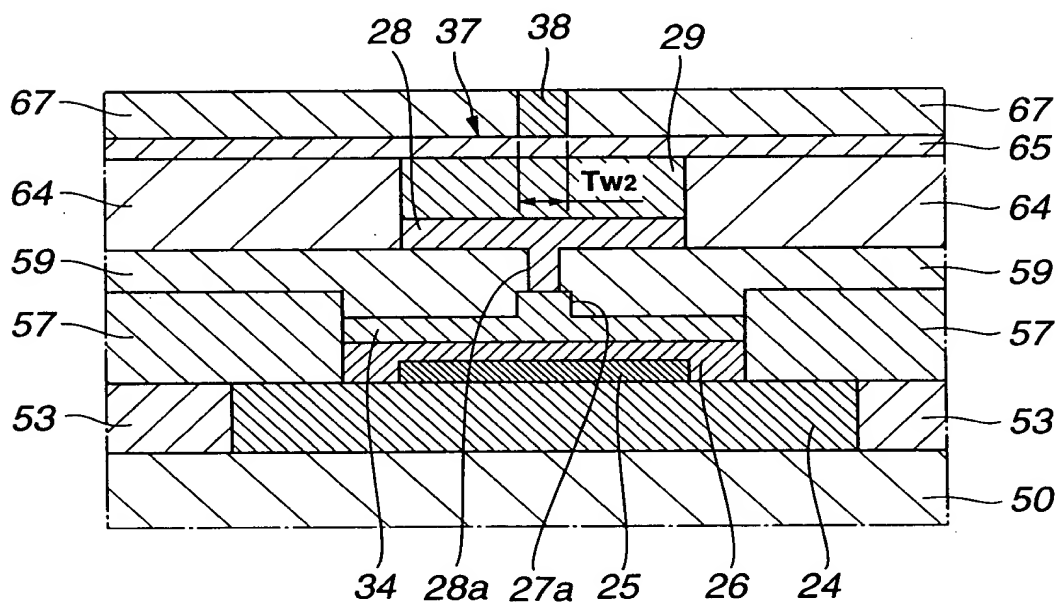
**FIG.38**



**FIG.39**



**FIG. 40**



**FIG. 41**

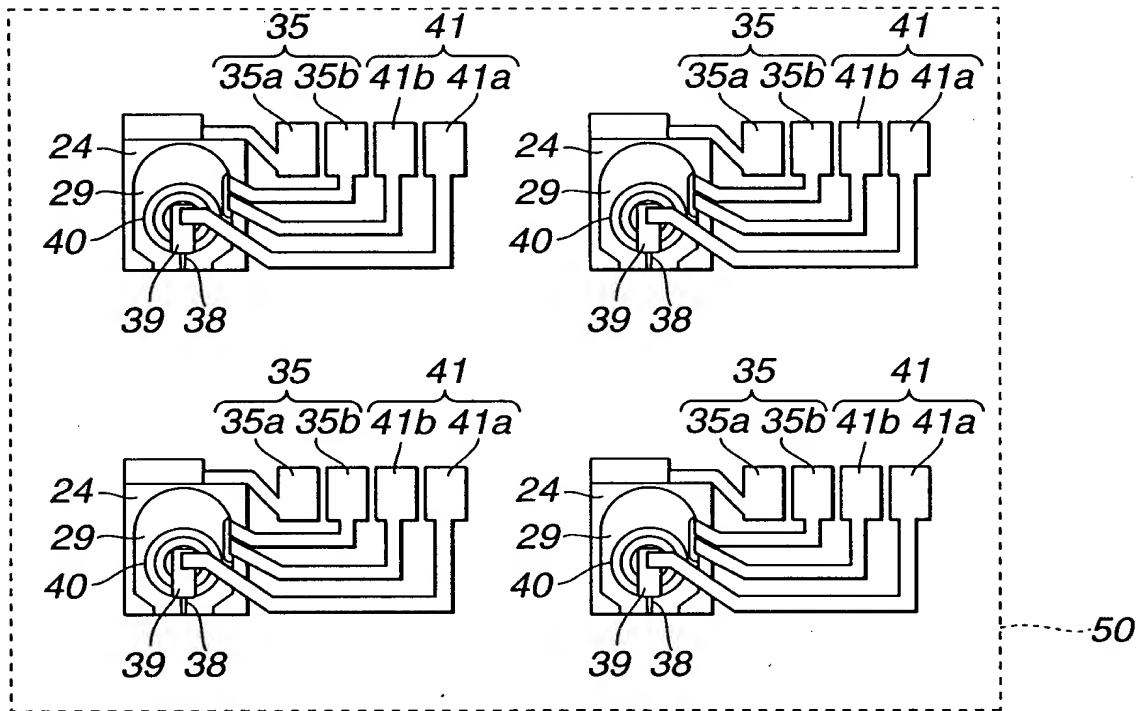


FIG.42

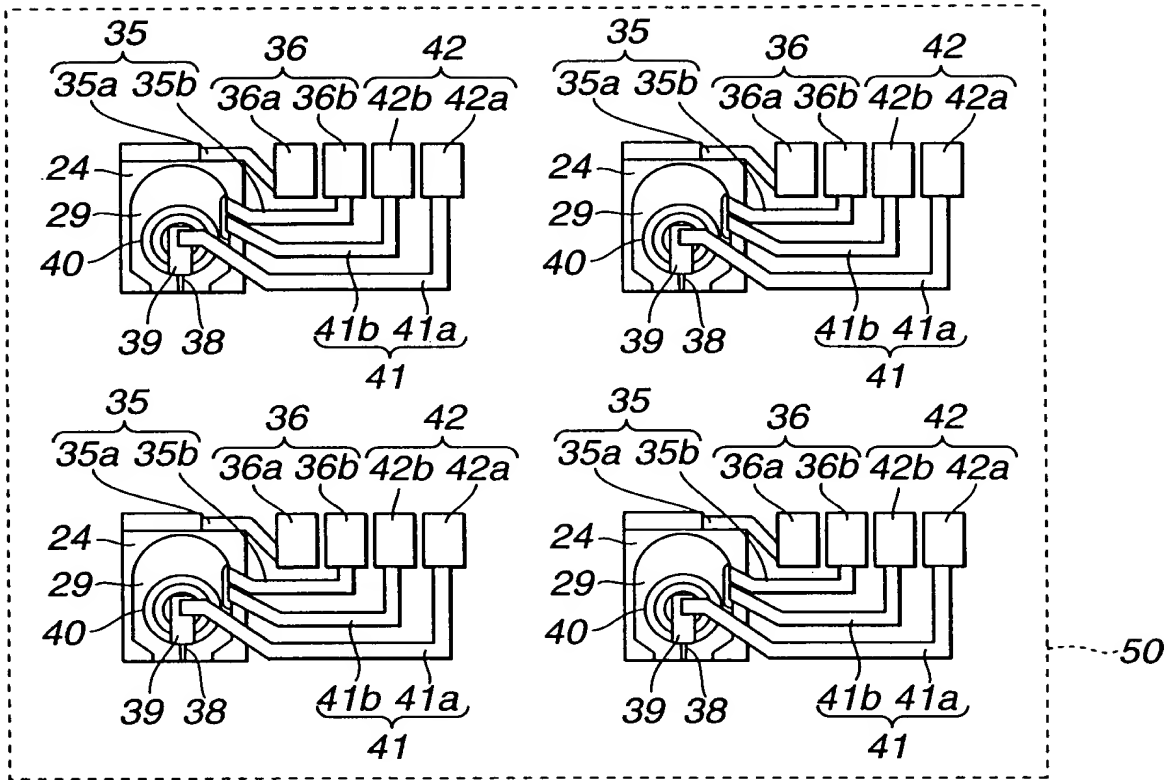


FIG. 43

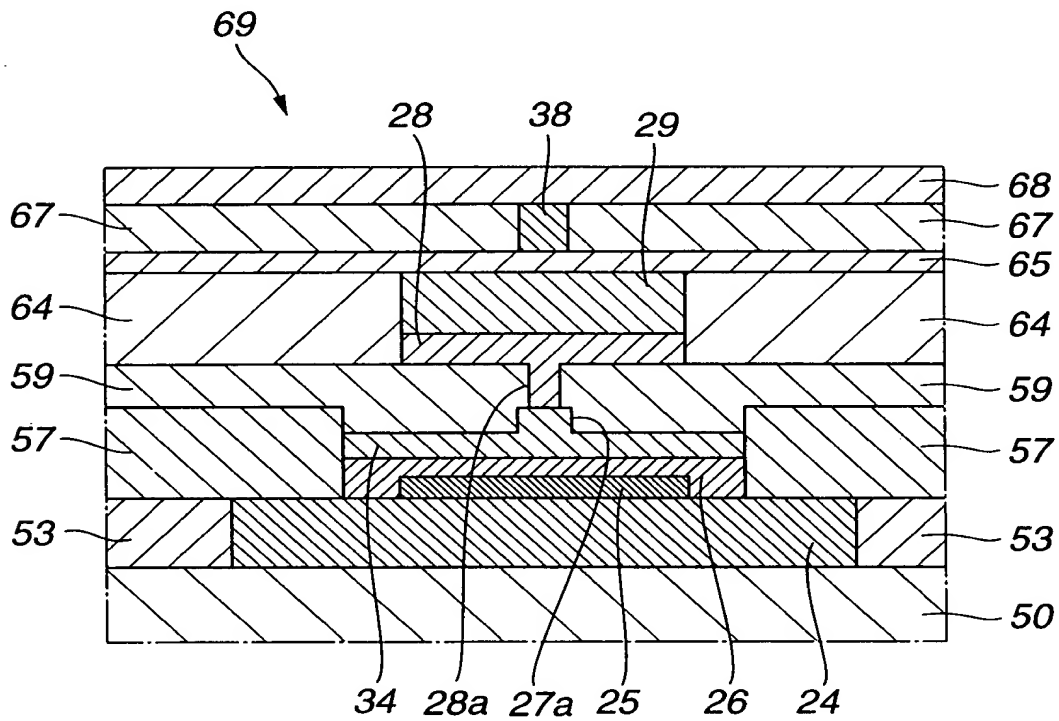


FIG. 44



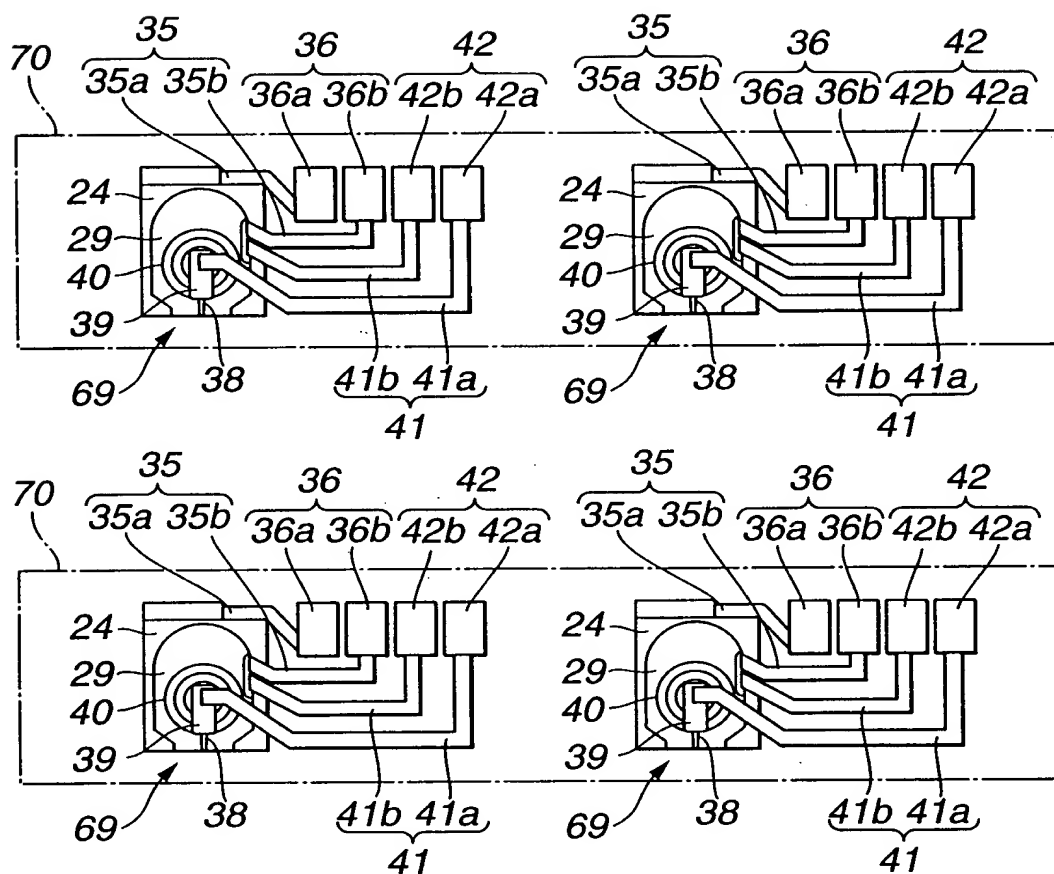
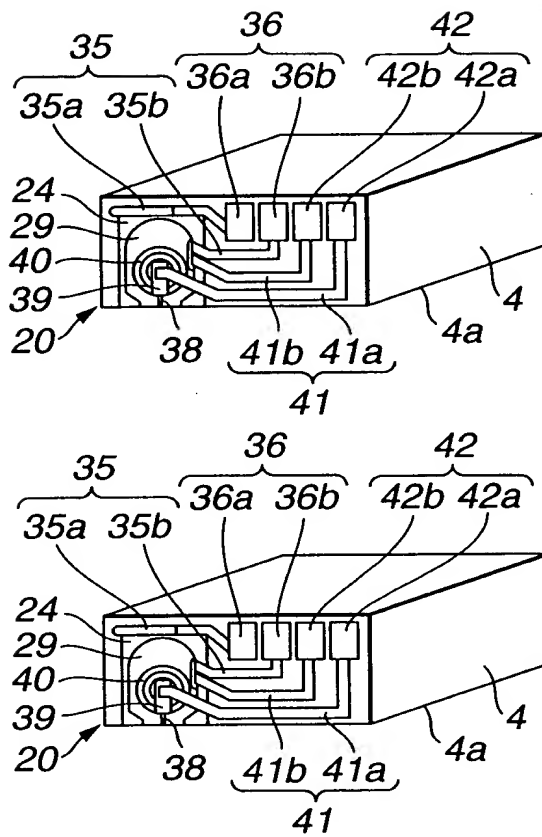
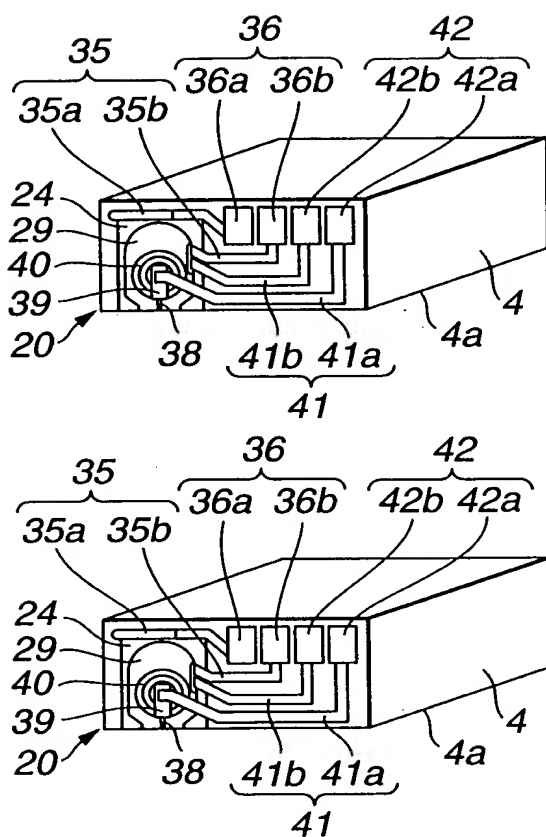


FIG.45



**FIG.46**

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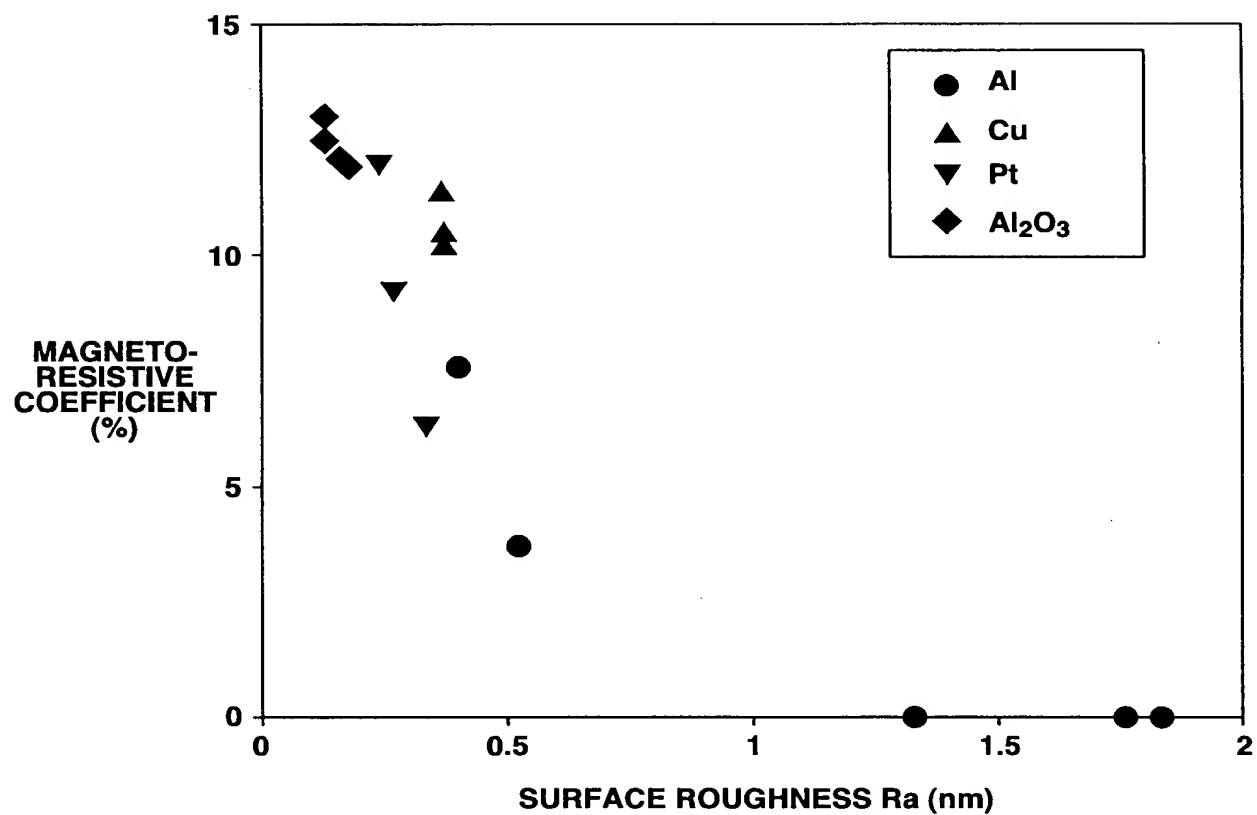


FIG.47

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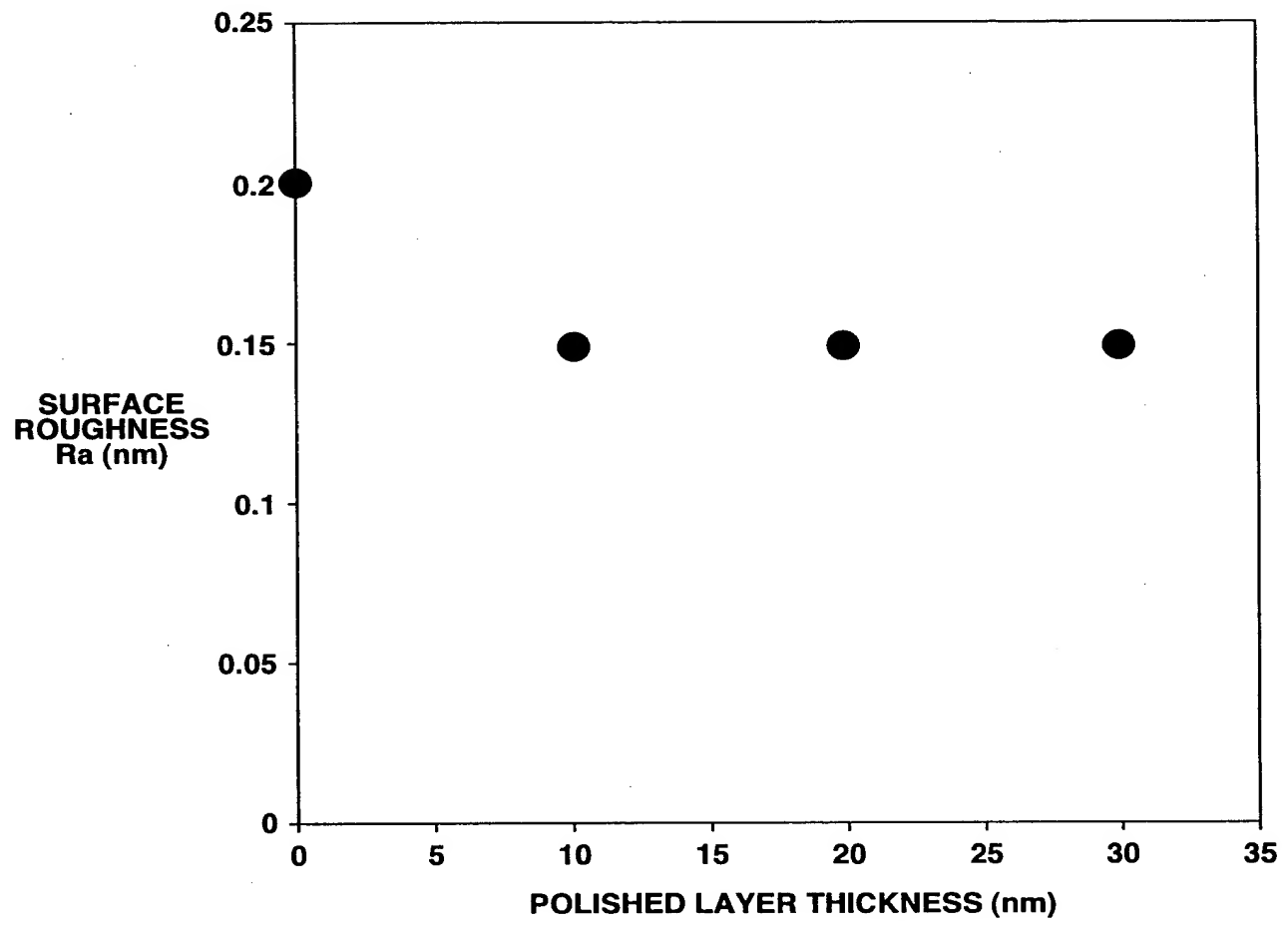
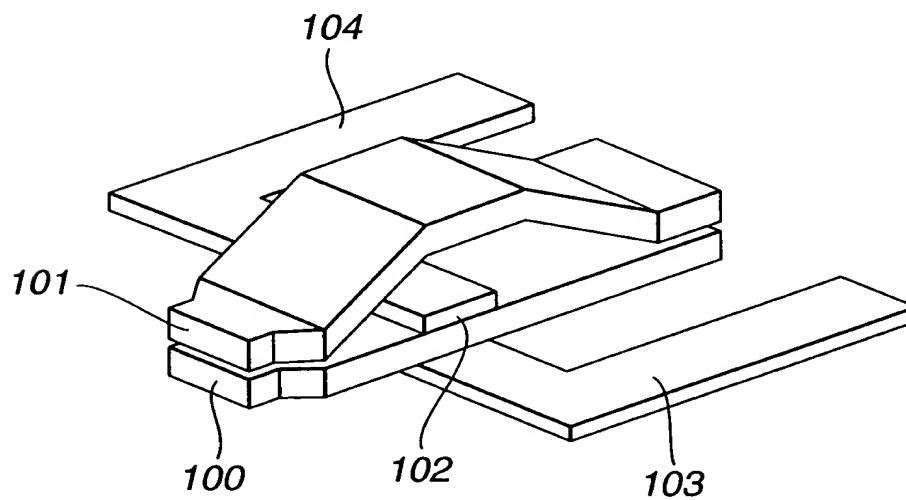


FIG.48

The graph plots Surface Roughness  $R_a$  (nm) on the y-axis (0 to 3) against Layer Thickness (nm) on the x-axis (0 to 120). Four materials are compared: Al (circles), Cu (triangles), Pt (diamonds), and  $Al_2O_3$  (inverted triangles). Al shows a significant increase in roughness starting around 25 nm, peaking at approximately 1.8 nm at 50 nm thickness, and then slightly decreasing. Cu, Pt, and  $Al_2O_3$  maintain low roughness values, generally below 0.5 nm, across the measured thickness range.

Layer Thickness (nm)	Al $R_a$ (nm)	Cu $R_a$ (nm)	Pt $R_a$ (nm)	$Al_2O_3$ $R_a$ (nm)
20	-	-	-	0.15
25	0.40	-	-	-
30	0.50	0.35	-	-
35	1.30	0.25	0.25	0.15
40	-	-	-	0.15
50	1.80	0.35	0.25	0.15
60	-	-	0.25	-
100	1.75	0.35	0.35	0.20
105	-	-	0.35	-

**FIG.49**



**FIG.50**